FUTURE TRENDS OF INDUSTRY 4.0
COGNITIVE ASSISTANCE SYSTEMS IN MANUFACTURING

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Future trends of Industry 4.0

**Agenda**

- Economic benefits of assistance systems
- Experience digitized production
- Development of new technologies for assistance systems
Benefits of assistance systems
Assembly of pneumatic cylinders

Assembly: highest share of production costs

Lean production and introduction digital assistance systems

50 % decrease of direct costs

30 % increase of production volume
Benefits of assistance systems
Spin-off Sicony

Digital worker guidance
- Comprehensive solution from creation of instructions to usage on the shopfloor
- Use of web technology
- Flexible integration

Human-centered support
- Simple creation and maintenance of work instructions
- Pictograms prevent language barriers

Picture source: Sicony GmbH
Learning factory for cyber-physical production systems
From paper-based to paperless assembly

Target group: Production managers

Learning objective: Participants experience the potentials of paperless assembly

Use case: Assembly of custom-designed remote controlled cars
Learning factory for cyber-physical production systems

Roles and their responsibilities

**Assembly worker**
- Performs assembly tasks
- Responsible for quality

**Production manager**
- Shopfloor management
- Responsible for productivity
- External communication

**Logistics**
- Responsible for material supply
- Transport between assembly stations
Learning factory for cyber-physical production systems

Three rounds with different worker support

1: Paper-based
- No digital support
- Two documents: Order sheet and general work instructions

2: Hybrid
- Barcode scans on stationary terminals for each step
- Tracking of order status

3: Paperless
- RFID-based tracking
- Use of tablets
- Order-specific assembly instructions
Learning factory for cyber-physical production systems

Outcomes

Productivity: Tracking of produced cars during each 40 min. round

Acceptance: Impact of digitization on worker satisfaction

Transfer: Discussion of possible implementations
Augmented Reality Maintenance

Use Case

- Maintenance tasks of CNC-lathe
- Fast qualification of maintenance technicians and machine operators

Main requirements:
- Hands-free
- No specific knowledge required
Augmented Reality Maintenance Video
Augmented Reality Maintenance
Experience with test groups

- Mixed acceptance of voice and gesture control
- Necessity of feedback for user
- Further development of tracking technology needed
- Ergonomic requirements not fulfilled by current hardware

Picture source: Microsoft
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Conclusion

Market-ready industry 4.0 solutions are already available.

Learning factories accelerate the transfer of new technologies.

Cooperation of research and industry is needed to fulfill the right requirements.
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Thank you for your attention

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